

**UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MARYLAND**

UNITED STATES OF AMERICA

v.

CRIMINAL NO: TDC-24-211

HOAU-YAN WANG,

Defendant.

**GOVERNMENT’S RESPONSE IN OPPOSITION
TO DEFENDANT HOAU-YAN WANG’S
MOTION IN LIMINE TO EXCLUDE DIGITAL IMAGES OF WESTERN BLOTS**

The United States of America, though its undersigned attorneys, respectfully submits this response in opposition to Defendant Hoau-Yan Wang’s Motion to Exclude Digital Images of Western Blots.¹ The government will be able to authenticate the images as source images for the Western Blots that were included in applications for NIH grants, and which are at issue in this case, and, as such, the motion should be denied in its entirety.

Federal Rule of Evidence 901 requires that evidence be authenticated and provides that “the proponent must produce evidence sufficient to support a finding that the item is what the proponent claims it is.” Fed. R. Evid. 901(a). The rule goes on to provide several non-exhaustive examples of how to authenticate evidence, including by testimony of a witness with knowledge, comparison by an expert witness, distinctive characteristics, and others. See Fed. R. Evid. 901(b). The Fourth Circuit has held that “the burden to authenticate under Rule 901 is not high—only a *prima facie* showing is required.” *United States v. Vidacak*, 553 F.3d 344, 349 (4th Cir. 2009).

¹ The Motion is styled both as a Motion in Limine to Exclude Images of Western Blots (ECF No. 100 at 1) and a Motion in Limine to Exclude Testimony or References to Images as Source Images (ECF No. 100-1 at 1). Given this confusing posture, the government presumes that Defendant Wang is seeking to exclude the images in their entirety, and in the alternative, seeking to prevent the government from referring to the images as “source images,” and has responded in that fashion.

The proponent need only present sufficient evidence to satisfy the rule; the ultimate factual determination of whether evidence is what the proponent claims it to be is left to the jury. *Id.* (citing *United States v. Branch*, 970 F.2d 1368, 1370 (4th Cir. 1992)). The district court need only conclude that “the jury *could* reasonably find that the evidence is authentic, not that the jury necessarily *would* so find.” *United States v. Banks*, 29 F.4th 168, 181–82 (4th Cir. 2022) (internal quotations omitted) (emphasis in original).

As a threshold matter, there are generally three categories of images that are relevant to this case, and most of the images fall into these categories—source or raw images, white box images, and published final images. The source images are scans of raw Western Blots that appear to have not been altered. An example of a raw source image can be found at Exhibit A. The source image usually contains several Western Blots that are generally set up in a grid formation, and all of them appear to be raw, unadjusted Western Blots. The next type of images are white box images. These are copies of the source images, but with one or more of the Western Blots overlayed with a white box that contain horizontal bands that generally do not appear in the source image. An example of a white box image can be found at Exhibit B. The white box images are clearly copies of the source image because (1) all of the features of the image are identical other than the presence of a white box on one of the Western blots, and (2) even the white boxes often retain background noise (i.e., distinctive visual characteristics) from the source image. The last category of images are final images—these are the ones that were used for either publication or in a grant application. These usually contain additional information, such as molecular weight markers, densitometry data, or other relevant information. An example of a final published image can be found at Exhibit C. The government contends that the horizontal bands contained within the white box on the white box image contain the blots that are depicted on the final images, and the government contends

that the raw source images are the original films that were used in the experiment. That is why the government has used the naming conventions for the categories described above.

Defendant Wang does not appear to have taken issue with the authentication of the final images—published journal articles or NIH grant applications—for purposes of this motion, nor does he appear to have objected to the proposed nomenclature of “final image” or “published image.”

Defendant Wang, however, has taken issue with the other two categories. With respect to those images, the government will present sufficient evidence to both authenticate the images for introduction, as well as authenticate them as source images of the NIH grant applications, through a multi-step process.

The images themselves were obtained by the government via a search warrant that was conducted of Defendant Wang’s home. During that search, which was the subject of the motion to suppress and the suppression hearing in December 2024, FBI Special Agent Jeffrey Weeks collected Defendant Wang’s laptop and his thumb drive (along with other electronic devices). In a previous interview of Defendant Wang, he told Special Agent Weeks that he used his thumb drive to transfer Western Blot scans from his lab desktop computer to his laptop, after which he would save the files on his personal laptop, which he said was with him at all times. *See* August 31, 2021 Memorandum of Interview of Dr. Hoau-Yan Wang, Exhibit D at 1. After recovering his personal laptop and thumb drive, the government discovered exactly what Defendant Wang said that they would discover—scanned images of Western Blots, including both raw images and white box images. The interview of Defendant Wang, the search warrant, and the collection will all be subject matter covered in Special Agent Weeks’ testimony at trial.

Special Agent Weeks will further testify that upon inspection of the files on the devices recovered from Defendant Wang's residence, he was able to identify certain Western Blot images that appeared to be related to each other by filenames, their folder location, or other characteristics. For example, Exhibit A had the filename "origene-test9 JR.jpg" and Exhibit B had the filename "origene-test9 JR-11.jpg" suggesting, even before opening the files, that Defendant Wang had related them to each other. Oftentimes the potential source image and its white box image were also temporally related, meaning, the last time each had been modified was close in time to one another. At times, the white box images and the source images were contained in the same folder within Defendant Wang's folder structure. Additionally, at times, Special Agent Weeks undertook a visual inspection to determine whether images appeared to be related to each other by distinctive characteristics.

The filenames also helped associate the files with the final images, as the file names are often indicative of the specific experiment being performed. For example, the final published image at Exhibit C² contains three blots, one of which is labeled "origene," which is referenced within the filename of the source and white box images.

After Special Agent Weeks matched up source and white box images with each other and with potential final published images, he sent those documents to Dr. Brookes for analysis. However, Special Agent Weeks did not just send his potential matches, he sent thousands of Western Blot images and PowerPoint files containing Western Blot images he was able to recover from Dr. Wang's devices to Dr. Brookes. As this Court has seen, Dr. Brookes then undertook a painstaking process in order to determine whether the images in fact matched, and whether there

² Exhibit C is an excerpt from Grant 5, which contains the final published image that relates to Exhibits A and B.

were additional related images within the larger set of JPEG images and PowerPoint presentations Special Agent Weeks provided him.

This multi-step process is more than sufficient to authenticate the images given the standards set forth under Rule 901 and the caselaw.

Defendant Wang raises several issues with this process, including the lack of digital continuity, the lack of a witness with personal knowledge, and the lack of a proper baseline comparison image. For various reasons, these arguments are misguided.

In the first instance, Defendant Wang seems to suggest that if the government does not match images through MD5 hash values, then there is no way to authenticate them, but this misstates the standard for authentication, the practice of authentication, and the law.

The “break in the chain” Defendant Wang describes is no bar to authenticating the image. As stated above, authentication is not a particularly exacting standard. *See Vidacak*, 553 F.3d at 349. Additionally, *Vidacak* itself found that a perfect chain of custody is not required. *See id.* at 351 (finding circumstantial evidence to be sufficient even when the documents’ precise origin could not be traced: “a proponent need not establish a perfect chain of custody or documentary evidence to support their admissibility”); *see also United States v. Howard-Arias*, 679 F.2d 363, 366 (4th Cir. 1982) (evidence can be admitted even with a “missing link” where “the authentication testimony was sufficiently complete so as to convince the court that it is improbable that the original item had been exchanged with another or otherwise tampered with.”)

Defendant Wang can point to no court that requires hash value analysis to authenticate digital images, for good reason. If Defendant Wang’s rule was the law, a clever fraudster could easily hide his tracks using the exact method that Defendant Wang’s expert described—moving

digital files to different software in order to obscure its hash value—and thereby defeat the admissibility of the digital files forever.

Additionally, Courts have blessed the type of circumstantial evidence that the government is using here to authenticate the images as source images of Defendant Wang's final Western Blots. *See, e.g., United States v. Smith*, No. 23-4242, 2025 WL 227717, at *4 (4th Cir. Jan. 17, 2025) (upholding authentication of a Snapchat video based on the fact that it was sent the same day as the events at issue in the case, and other circumstantial evidence showed that the contents of the video were in fact showing the crime that had been charged); *United States v. Davis*, 918 F.3d 397, 402-03 (4th Cir. 2019) (finding that text messages sent by the defendant that were introduced in the form of pictures of an informant's cellphone screen were properly authenticated through circumstantial evidence and context even when the government did not introduce evidence linking the phone number sending the texts to the defendant); *United States v. Umana*, No. 3:08CR134-RJC, 2010 WL 1570393, at *2 (W.D.N.C. Apr. 19, 2010) (upholding the admission of letters written by the defendant, which were authenticated through circumstantial evidence, including the fact that some of them (but not all) had the inmate's name and inmate identifier number and the fact that the contents of the letters were consistent with verbal statements of the defendant and contained information about the defendant's own medical conditions, and further finding that the objections about the provenance of the letters go to weight, and not admissibility).

Here, Special Agent Weeks and Dr. Paul Brookes will outline several circumstantial facts—the interview of Defendant Wang in which he confirmed where he kept his original images and that he considers the scans of the Western blot films to be original records,³ the fact that he recovered the images from the Defendant at his own residence, the metadata Special Agent Weeks

³ See August 30, 2021 Interview of Hoau-Yan Wang, Exhibit E at 2.

was able to recover, and the image analysis Dr. Brookes was able to conduct—to make the *prima facie* finding that the source and white box images are related to the final images.

Defendant Wang next points to the fact that no witness has personal knowledge of the images in question, but that is not correct. As described above, Special Agent Weeks interviewed Defendant Wang several times, including once in which the defendant admitted to the fact that he “used a thumb drive to transfer Western Blot scans from his lab desktop computer to his laptop. . . . He then saved all the files to his personal laptop, which he keeps with him at all times.” Exhibit D at 1. Defendant Wang confirmed that the source images—the scans of his Western Blots—can be found on his personal laptop and thumb drive, *exactly where Special Agent Weeks found them*. This is powerful testimony that the scans are exactly what they appear to be, source images for the final blots. Additionally, this also rebuts Defendant Wang’s contention that the government should have been able to produce another witness who could provide percipient fact testimony about the formatting of the images. Motion at 11. The Defendant himself confirmed that he took the images home. Exhibit D at 1. The fact that Defendant Wang himself provided a roadmap to the location of his source images is powerful evidence that they are what they appear to be.⁴

Defendant Wang next argues that the comparison that Dr. Brookes performed is not sufficient to authenticate the images recovered from the warrant as “source images,” because there is a possible alternative source image that could be the right one. This is an argument that goes to weight, not admissibility. Defendant Wang’s counsel is free to cross-examine Dr. Brookes—as she has at the *Daubert* hearing—about the potential for alternative explanations, and she is free to cross-examine Special Agent Weeks about his investigation, however, that does not defeat the fact that the images have enough indicia of authenticity to be admitted as the source images for the

⁴ The government also intends to offer evidence pointing to Defendant Wang himself as the reason that the original films (not the scans, but the actual films) had been disposed of or are otherwise unable to be located.

final images. Additionally, Defendant Wang's potential alternative explanation does not hold together. What possible reason could there be to put the white box image on a scan that does *not* correspond to the original source image? The fact that there is some hypothetical alternative explanation, no matter how far-fetched, cannot defeat authenticity, especially when the standard is whether "the jury *could* reasonably find that the evidence is authentic, not that the jury necessarily *would* so find." *Banks*, 29 F.4th at 181–82.

CONCLUSION

The government can properly authenticate the source images and white box images for admission as exactly what the government is calling them—source images for the final Western Blots at the center of this case. For all of the foregoing reasons, the motion should be denied in its entirety.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a copy of the foregoing was filed with the Clerk of the Court using the CM/ECF system, which will send notice to all counsel of record.

/s/
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